

Watershed Management Initiatives in Ethiopia

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Overview

1. Introduction
2. Research Initiatives
3. Development Initiatives
4. Challenges
5. Lessons
6. Conclusion and recommendation

Introduction

- ❖ Agriculture is the **dominant economy**; accounting for about 50% of the GDP, 90% of the total export earnings, over 80% of employment, and 70% of the raw materials.
- ❖ Land degradation (e.g. soil erosion and nutrient depletion) has been major national agenda and remains important issue in Ethiopia

❖ This is because LD impacts

- ✓ Land productivity
- ✓ Environmental services
- ✓ Food security and the quality of life

❖ The country has highly diverse farming system and agro-ecology due to high variation in altitude

- ✓ Diverse altitude (120m below sea level- 4600+m above sea level)
- ✓ Diverse climate (desert-humid highland)
- ✓ Diverse soils

Why Watershed management is important?

- Land degradation (e.g. soil erosion) is increasing





Such type of degraded lands is common in Ethiopia





Water quality is declining

Major part of the eroded sediment ended up in streams, rivers, reservoirs and lakes





water bodies are endanger due to Sedimentation



Water availability is declining?



Drought

If only it would rain!



Causes: Cultivation of steep slopes



Causes: Deforestation



Causes: Deforestation for cultivation



Causes: Deforestation of steep slopes



Removal of crop residue *via ploughing, cultivation, in-field burning, cattle feed, household fuel*



Causes: Overgrazing



- **Therefore, huge investments have been made to reverse land degradation in Ethiopia since 1980's in:**
 - **Research activities**
 - **Development initiatives**

Research Initiatives (RI) in watershed management

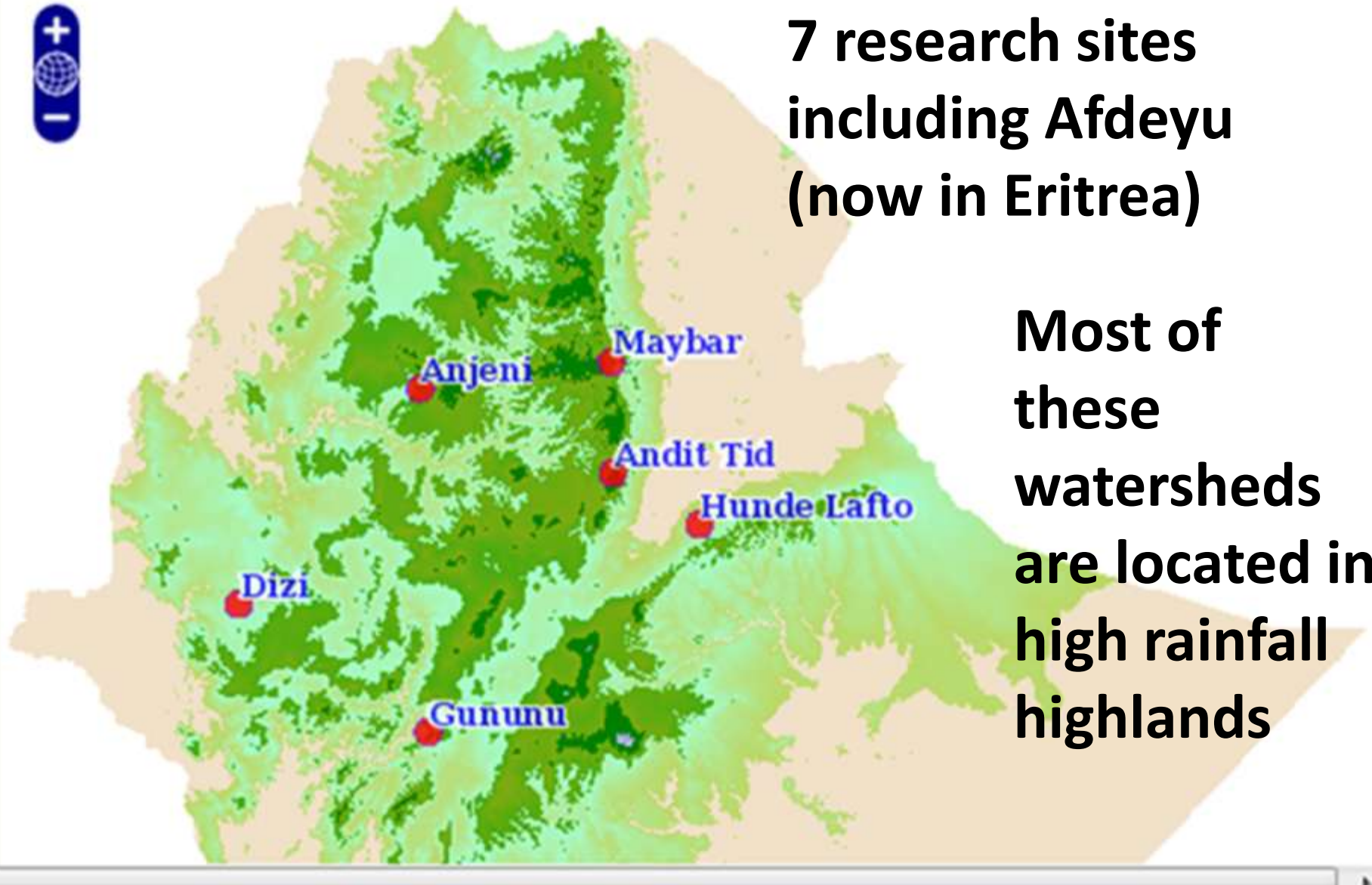
RI(1): SCRP

- The first initiative in watershed management research started in 1981 with the establishment of Soil Conservation Research Project (SCRP)
- Following the 1974 drought
- Funded by Ethiopian and Swiss Governments
- Coordinated by the MoA and Bern University

RI(1): SCRP

**7 research sites
including Afdeyu
(now in Eritrea)**

**Most of
these
watersheds
are located in
high rainfall
highlands**



RI(1): SCRP

- Main focuses were
 - Rehabilitation of degraded landscapes using physical soil and water conservation (SWC) structures
- Based on small watersheds and there was lack of sectoral/system integration
- The effectiveness of SWC structures were based on
 - Soil loss
 - Runoff
 - Crop yield

RI (2): JVP

- The establishment of the Joint Vertisol project (JVP) in 1986 was the second initiative in watershed management research

- Multiple institutions

such as IAR (now EIAR), ILCA
(ILRI), AUA (HU), MoA, ICRISAT
were involved.

The research was conducted

✓ Ginchi and Cheffee

Donssa watersheds



RI(2): JVP

- More comprehensive and much better integrated than SCRP
 - Drainage technologies (BBM)
 - Water harvesting (from drained water)
 - Soil erosion control studies
 - Development of trees, crop, livestock and feed technologies suitable for Vertisols
 - Gender inclusion
 - Capacity building
- The research under the JVP was implemented until 2002.

BBM to drain excess water



Waterlogging tolerant wheat variety (ET-13) was developed



RI(3). Model/Learning watersheds

- EIAR (the then EARO) initiated the establishment of model watersheds
(+)
- African Highlands Initiative (AHI)
- Establishment of watershed management research program in the NARS (2008/9)
 - ✓ Focused on development of approaches and methods for WS management
 - ✓ Much more integrated than JVP

RI(3). Model/Learning watersheds

❖ Use of multiple interventions and approaches

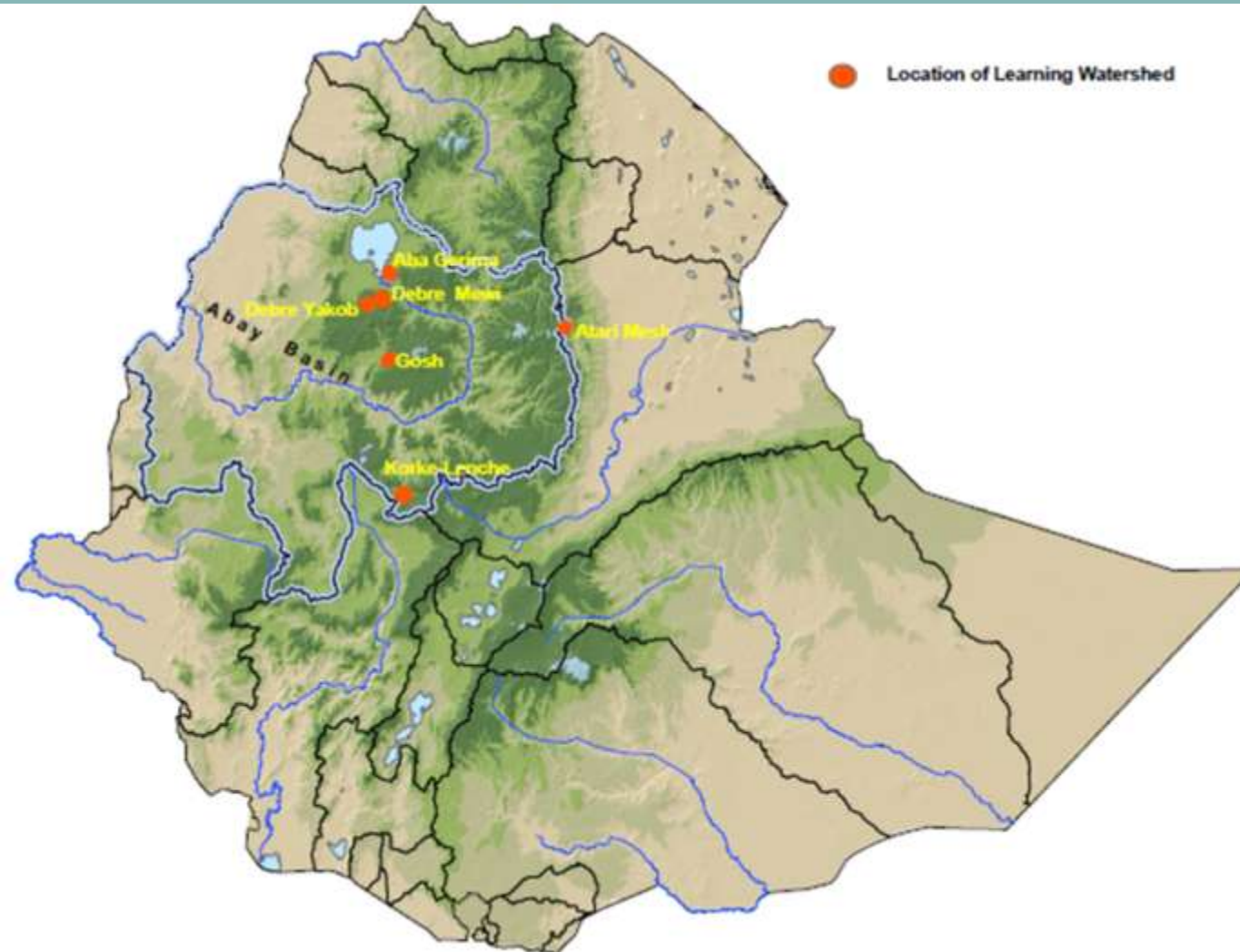
- ✓ **Development interventions**
- ✓ **Empirical Vs Action research**
- ✓ **Use of FRGs, FFS, IPs**
- ✓ **Use of linked technologies**

RI (3). Model/Learning watersheds

1. Galessa watersheds (since 2002/3)
 - Cereal based farming system with high rainfall
2. Adulala watershed (since 2002/3)
 - Cereal based drylands
3. Gununo watershed (since 2002/3)
 - Enset-based farming system with high rainfall
4. Somodo watershed (2008/9)
 - Coffee-based farming system with high rainfall area
5. Mekentuta watershed (2008/2009)
6. Borodo watershed (2008/9)

RI(3). Learning/Model watersheds

- Water and Land Resource Center (WLRC)



Six learning watersheds are ongoing by WLRC

Case study: Galessa watershed

Major watershed problems

1. Water shortage
2. Loss of indigenous tree species
3. Loss of soil, seed and fertilizer from excess runoff
4. Low soil fertility
5. Shortage of oxen
6. Lack of improved seed
7. Feed shortage
8. Wood shortage

Integration of watershed issues

Cluster 1: Soil and Water Conservation and Utilization (SWCU)Cluster:

- Poor water quality
- Water shortage for livestock and humans
- Loss of seed, soil and fertilizer from excess run-off
- Crop failure due to drought
- Loss of indigenous tree species

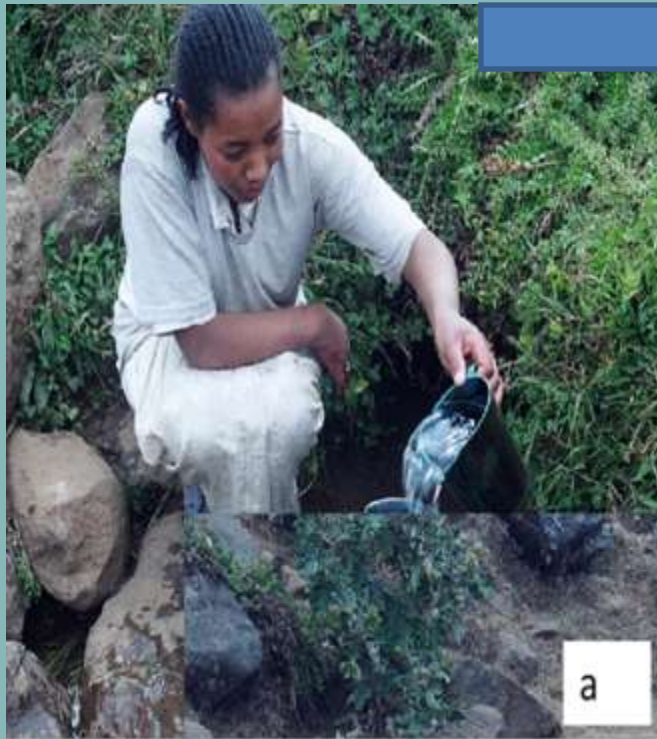
Integration of watershed issues

Cluster 2: Integrated Production and Nutrient Management (IPNM) Cluster.

- Feed shortage
- Wood shortage
- Soil fertility decline
- Loss of indigenous tree species
- Lack of income-generating opportunities

Some interventions ...

Spring development and management



Some interventions...

Soil and water conservation activities



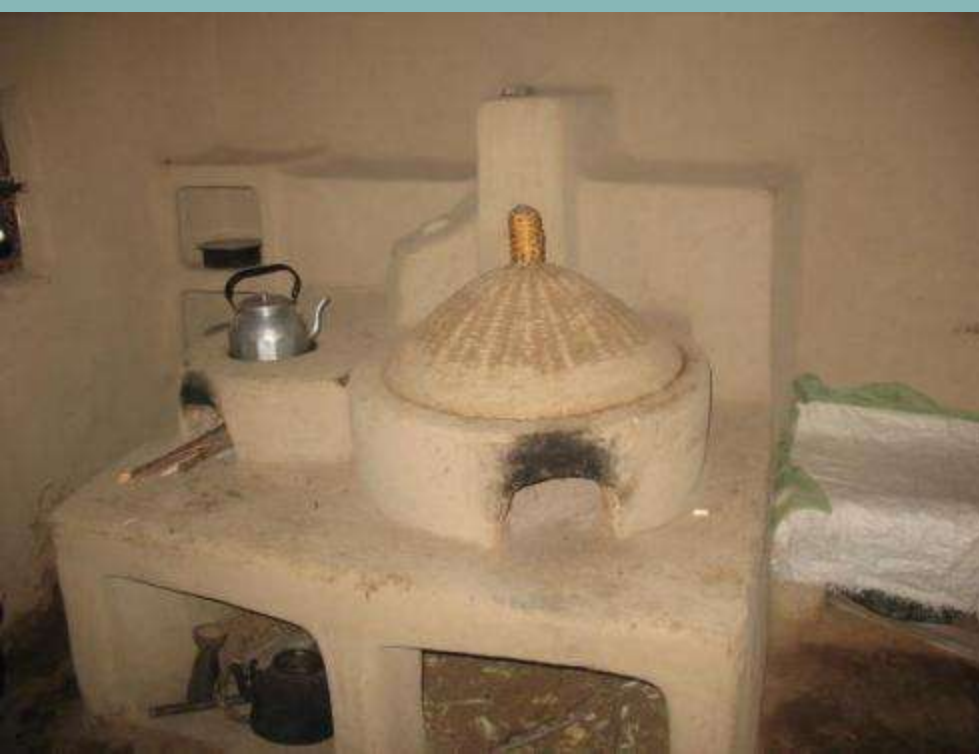
Some interventions...

community nursery and tree planting



Some interventions...

Energy saving stoves



Improved crop varieties...



Linking with technologies and -Potato with DLS



Diversifying improved crop varieties



Improved cows and Forage



Improved poultry for landless and women



High value fruits



Watershed development initiatives

Phase 1: 1974-1990

- WSM at national level was started in 1980s
- Top-down approach
- Mostly hillside terrace and exclosure programmes on degraded lands
 - Through Food-For-Work (FFW)
 - Mass mobilization
- Focused on food-insecure areas
- In this period huge investment was done mainly in physical SWC measures

Phase 2 : 1991-1995

- With the change in government in 1991
 - ✓ Limited focus for NRM
 - ✓ Several exclosures were deforested
 - ✓ Terraces were dismantled in some places

Regeneration phase (3): 1996-2004

- Initiation by regional governments
- Change in approach
 - No more FFW program
 - MERET project (Managing Environmental Resources for Enabling to Transitions to better livelihoods)
- Watershed management has focused beyond SWC
- High regional disparities
 - Amhara and Tigray regions were much better

2005-to date

- Highly coordinated at national and regional levels
- Use of several guidelines and frameworks
 - ✓ Guideline for community based participatory watershed development
 - ✓ Guidelines for PSNP - PW in Pastoral Areas
 - ✓ Environmental and Social Management Framework (ESMF)
 - ✓ Ethiopian Strategic Investment Framework for Sustainable Land Management (ESIFSLM)
- Focused on food insecure and secure areas, pastoral and agro-pastoral areas

2005-to date

Use of multiples Projects such as

- **PSNP (Productive Safety Net Programme)**
 - ✓ [7 reg. + DD; 319 woredas, (50% of Eth)],
- **MERET**
 - ✓ 5 reg. + D/dawa; 72 Woredas
- **SLMP (sustainable land management program- I and II)**
 - ✓ 6 regions; 137 woredas, 137 critical watersheds
- **Mass mobilization**
 - ✓ Free labour (on average 20 days per year)
 - ✓ 1.5 BL USD/year

2005-to date

- Entitlement of exclosures
- Multiple interventions
- Integration of income generation activities
 - ✓ honey production,
 - ✓ Fattening using zero grazing from exclosure



Some pictorial facts from Amhara Region

Training farmers



Trainees



Trainees



Use of influential leaders



Communities mobilized



Community mobilization





ANRS BoA, NRCWH

**Community
mobilization**

Community Discussion



Community Discussion



Community participation







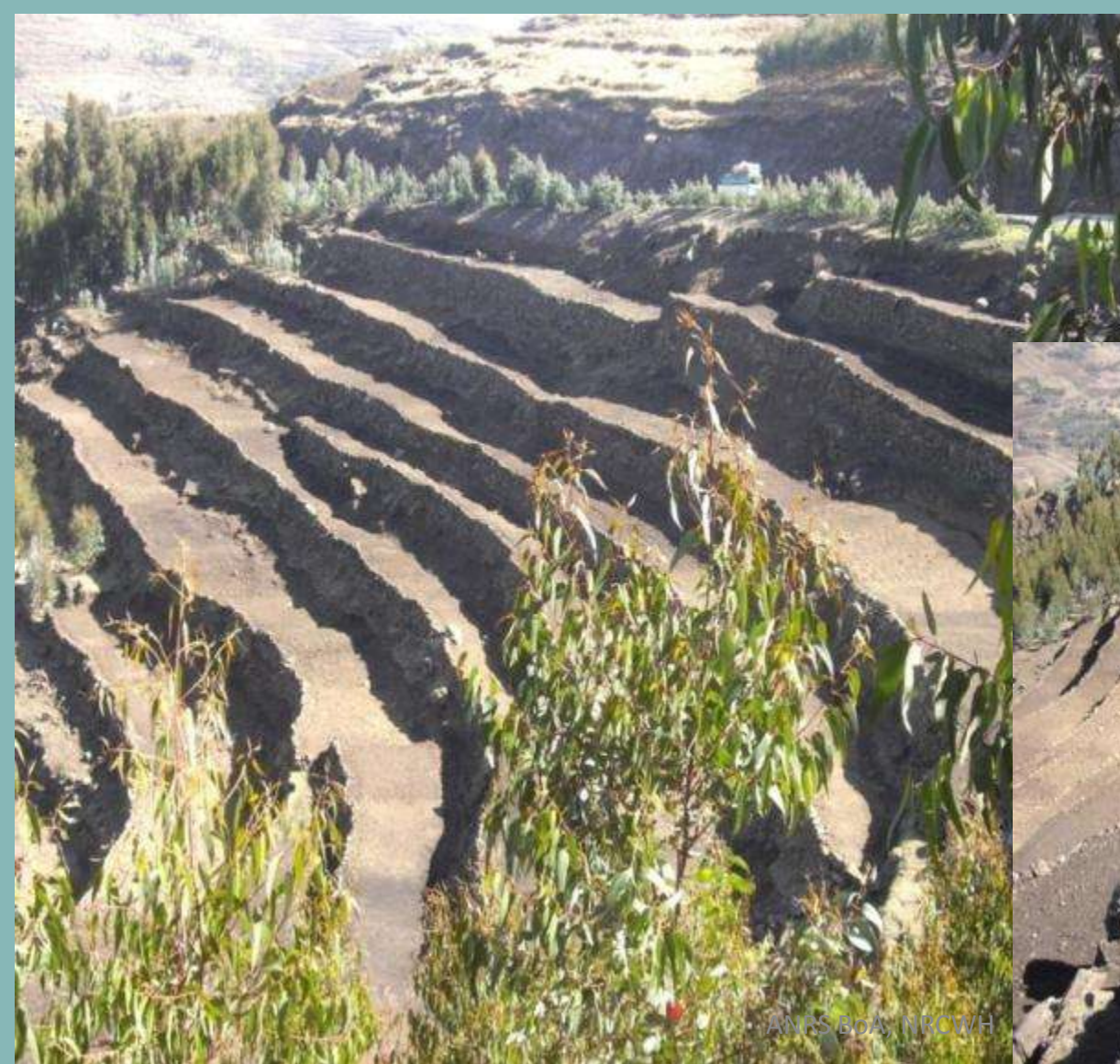
Women in controlling the quality of Work



Bench Terrace



Bench terrace



Stone bunds



stone bunds in exclosure



Bench terrace in exclosure areas



Protected sloppy lands



Water harvested is combined with terraces



Terraces increased water availability in the landscape



Terrace with tied-ridge for moisture conservation



Protected landscape



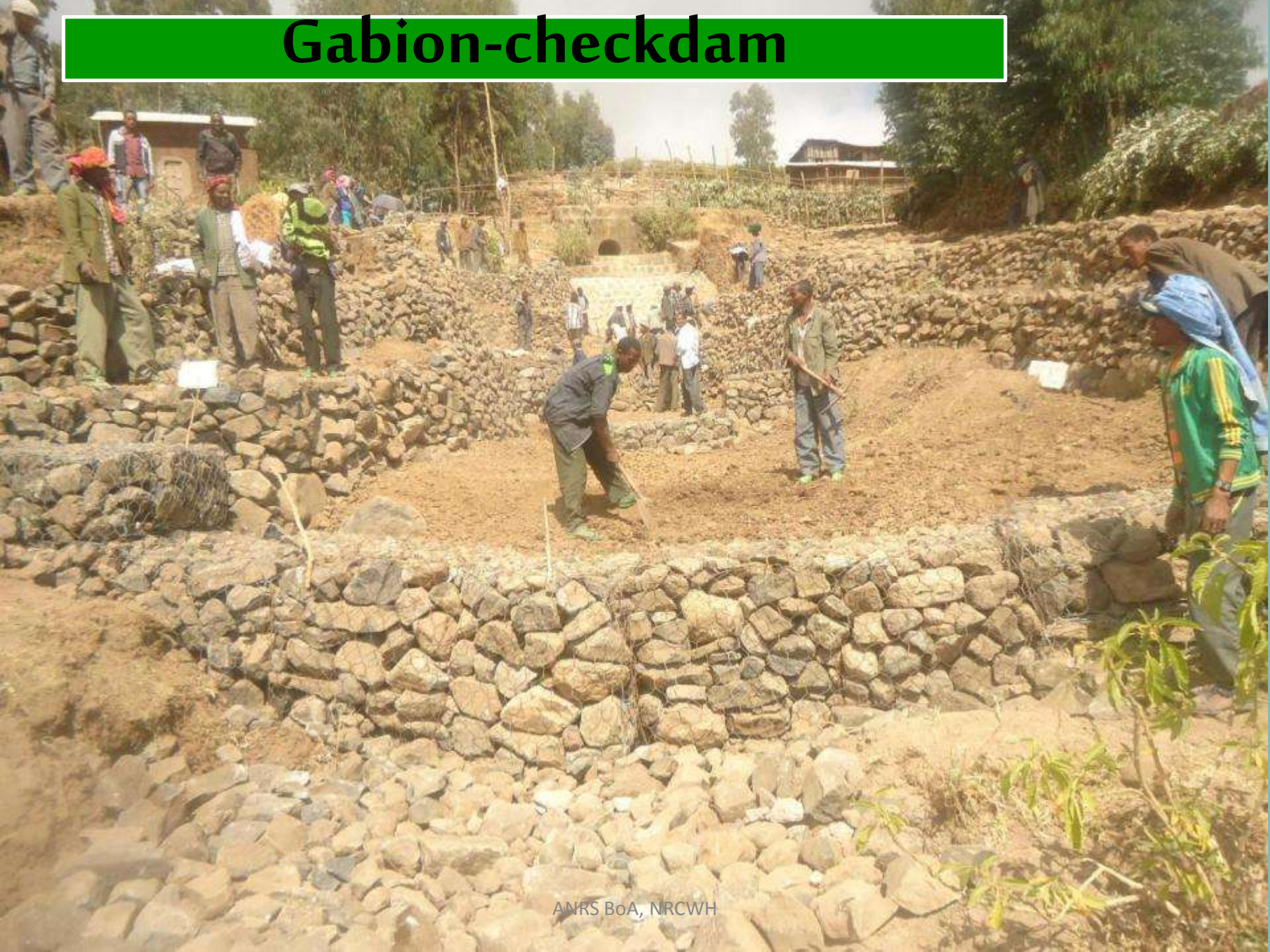
Protected landscape



Protected landscape



Gabion-checkdam



Gully control increases water availability



Gully Erosion control

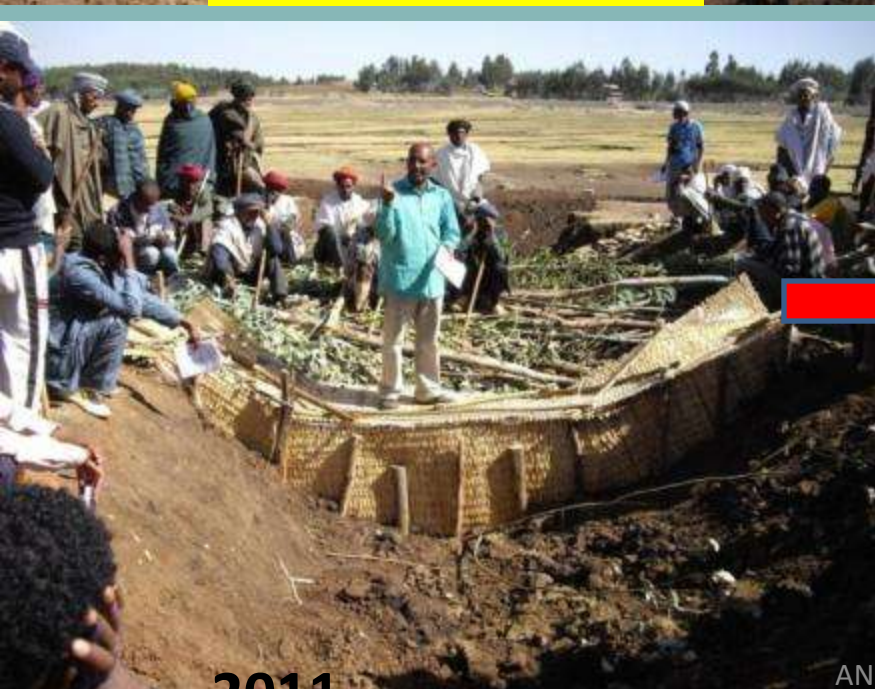




2011



2012



2011



2012

Before



After



Water harvesting is a key intervention in watershed management



Community ponds



Gully Treatment for Water Harvesting



Moisture conservation in arid areas



Exclosure



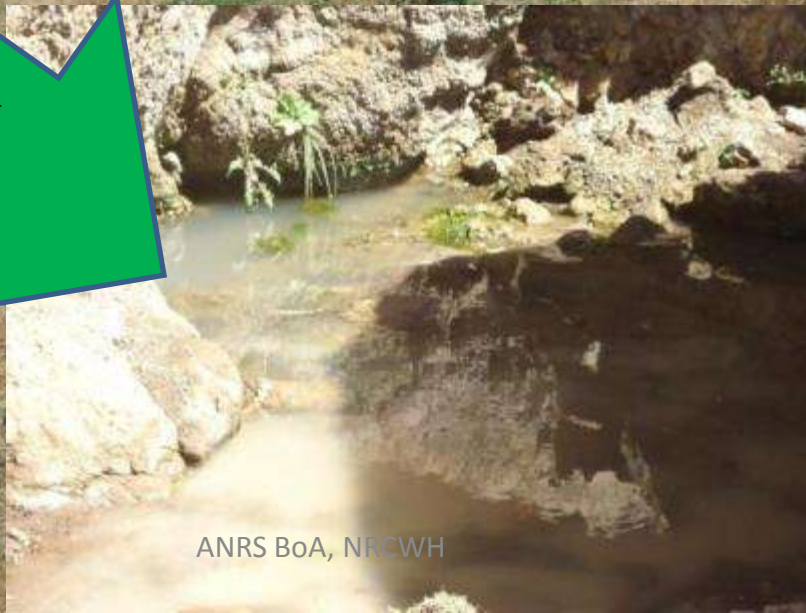
2010



2012



**Springs emerge below
rehabilitated hills**



Biological measures are integrated with physical structures



Biological measures: Hedge rows of TR



Irrigation canals



Irrigation by fetching water from shallow well



Fruit Nursery



Orange with water harvesting



Animal feed improvement



Result of area closure develops sense of ownership of the community through Cut and carry system



For jobless youth practicing Beekeeping on treated hillside



For jobless youth Beekeeping on treated hillside



Community tree nurseries



Reafforestation
program



Results from some projects

MERET

tf**98423ha** farmland terraces,

tf**270232ha** of hillside terraces,

tf**656,894 ha** of tree planting

tf**229** small dam constructions

tf**2548** pond construction

tf**6591** micro pond construction

tf**2116** spring development

tf**9565** rural road constructions

- t rehab. land **823,395 ha**
- t seedling planted **198,812 ha**
- t Const. com'y roads **44,528 km**
- t rehab. Com'y roads **88,756 km**
- t Const. and rehab. SSI **9095 km**
- t Const. ponds **212,840**
- t springs developed **9053**
- t class rooms const. & rehab. **4974**
- t com'ty hand dug wells **66980**
- t health posts constructed **619**

- 100,803 ha communal lands and gullies treated
- 116,613 ha of farmlands and homesteads treated
- 2162 ha of area put under SSI
- 37896 ha of area closures
- 1888 ha improved pasture manag't
- 236 micro and farm ponds constructed
- Various types of MPTs planted

SLMP (2008-13)

Indigenous experience

Several indigenous knowledge available in different parts of the country

- The Konso Bench Terrace (Registered by UNESCO)



Ankober Bench Terrace



Derashe Trash-line for moisture conservation



Gedio-agroforestry system



Challenges

- **Free grazing of livestock**
- **Managing multidisciplinary team and IP**
- **Lack of trained manpower**
- **PIWM is very costly**
- **Misconception of PIWM**

for example:

- **PIWM = SWC**
- **PIWM=Water harvesting**

Lessons learned

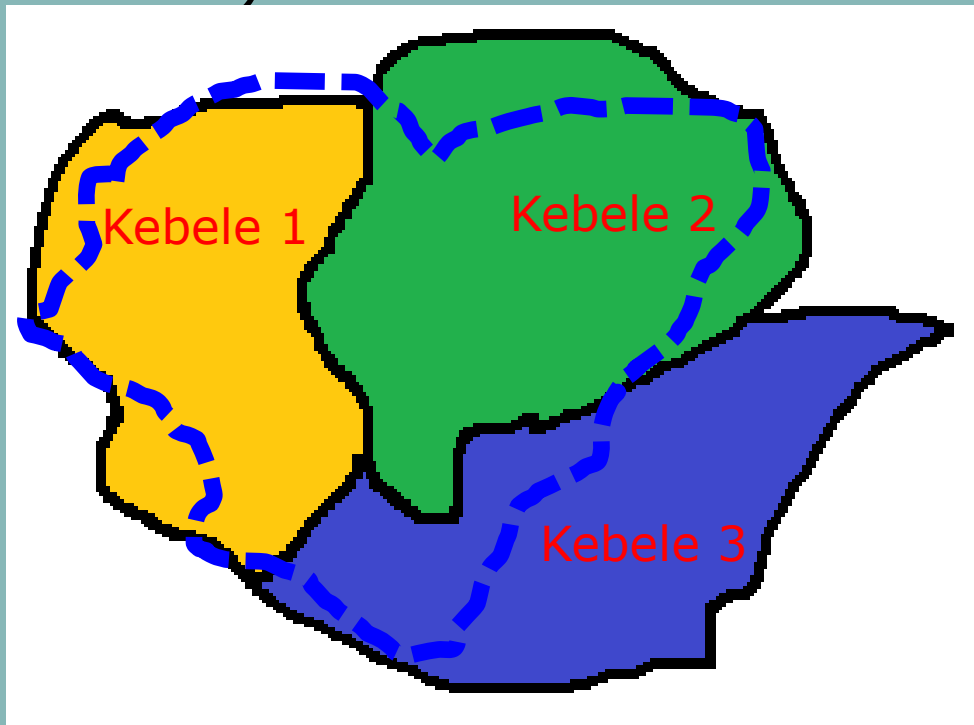
Need for baseline data

The impacts of most watershed projects are hardly evaluated mainly because of lack of clear data before the implementation of the project

Lessons learned

Managing hydrological and administrative boundaries

- *There is a mismatch between watershed and administrative (political) boundaries*
- Delineations for all watersheds were carried out using hybrid (balancing hydrological and socio-economic) criteria



Lessons learned....

Working with local communities starting from problem identification is crucial

- Problem identification and prioritization should be done using different social and interest groups,
- Mixed methodologies (qualitative and quantitative) are crucial to identify and prioritize watershed problems.

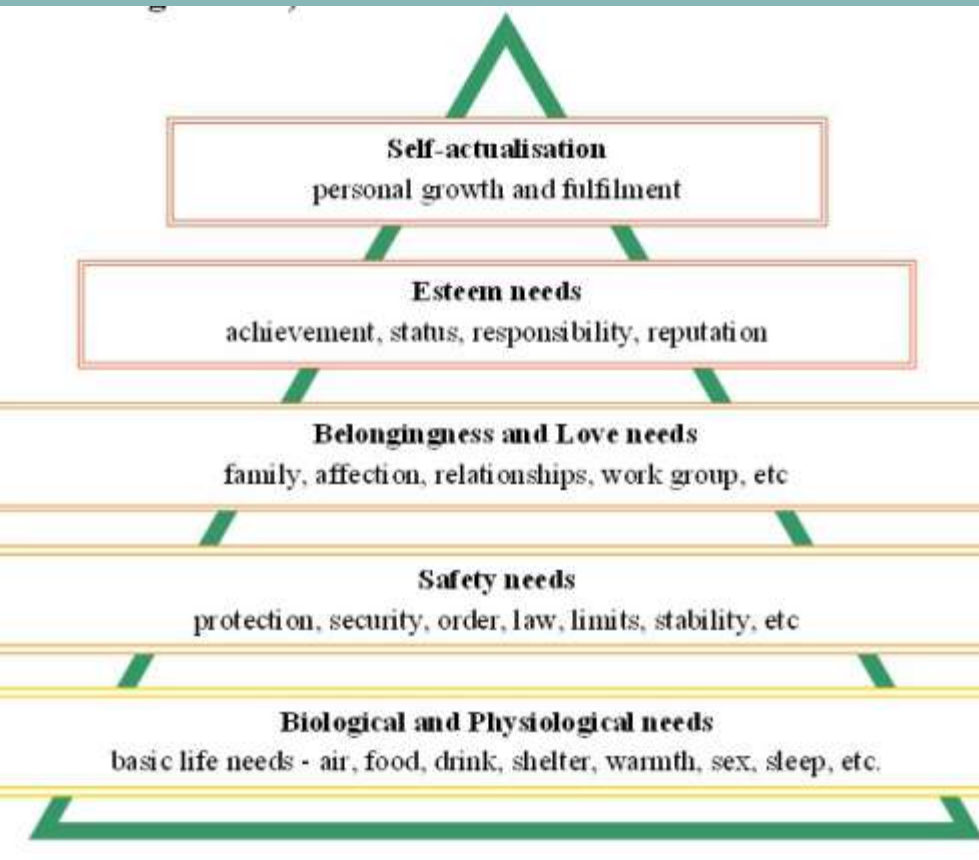


Lessons learned...

Investments in farmers' basic needs as entry points

- ✓ *Technology provision*
- ✓ *high-yielding varieties*

✓ *Clean water provision*



Pieri (1997)
adopted Maslow's
hierarchy of
needs for decision
making to invest in
land management

Maslow (1970))

Lessons learned...

Use of linked technologies

- Linked technologies were adopted to ensure compatibility between what farmers were doing and what land management is demanding.

e.g. Potato seed production was linked with compost technology.

→ Satisfies farmers demand for food security and improve the fertility of the soil in the watershed.



Lessons learned...

Use of empirical research

Empirical research can facilitate attitude change by making visible biophysical processes (such as soil and water losses) that are otherwise difficult to observe by farmers.



A comparative run-off experiment conducted on plots with and without bunds demonstrated farmers how soil bunds trap soil and water from plots.

Lessons learned...

Need for convergence of programmes and stakeholders

Use of bylaws for selected activities

Conclusion and recommendation

- Watershed management is not simple approach
- Multiple approaches and intervention are required for the success of watershed management
- It is necessary to link watershed management interventions with international and regional initiatives

Conclusion and recommendation

- Commitment of all stakeholders is basic for watershed management
- Although much has been achieved in watershed management, much more needed



Thank you for your attention!